

WHAT IS CLAIMED IS:

1. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising:
  - 5 a) introducing to donor swine cells a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent so as to yield transformed swine cells; and
  - 10 b) introducing the transformed swine cells to the recipient.
2. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising:
  - 15 a) introducing to donor human blood cells a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent so as to yield transformed human blood cells; and
  - 20 b) introducing the transformed human blood cells to the recipient.
3. A method to inhibit or prevent infectious agent transmission to a mammalian transplant recipient, comprising:
  - 25 a) introducing to a donor organ a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent so as to yield a transformed organ; and
  - b) introducing the transformed organ to the recipient.
- 30 4. The method of claim 1, 2 or 3 wherein the DNA segment encodes a fusion protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent and a degradative enzyme.

5. The method of claim 4 wherein the degradative enzyme is a nuclease or protease.
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6. The method of claim 1, 2 or 3 wherein the infectious agent is a virus.
7. The method of claim 6 wherein the polypeptide of the infectious agent is a viral capsid protein, viral glycoprotein or an accessory protein.
8. The method of claim 6 wherein the virus is a lentivirus, retrovirus, hepatitis virus or a herpesvirus.
9. The method of claim 1 wherein the donor cells are embryonic stem cells, blood cells, neuronal cells, liver cells, pancreatic cells, kidney cells or islet cells.
10. The method of claim 3 wherein the organ is a heart, liver or kidney.
11. The method of claim 3 wherein the organ is a human or pig organ.
12. The method of claim 4 wherein the DNA segment encodes a fusion protein encoding a polypeptide of a pig endogenous retrovirus.
13. The method of claim 5 wherein the enzyme is barnase, staphylococcal nuclease, RNase H1, RNase T1, retroviral protease, RNase III, RNaseL, or a ribozyme.
14. The method of claim 7 wherein the polypeptide of the infectious agent is Vpr, Vpx, Vif or Nef.
15. An isolated and purified nucleic acid molecule comprising a nucleic acid segment which comprises at least a portion of a pig endogenous retrovirus, wherein the nucleic acid segment hybridizes under hybridizing

- 5 16. An isolated and purified polypeptide encoded by a nucleic acid molecule comprising a nucleic acid segment comprising SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, or SEQ ID NO:32.
- 10 17. A method to detect human tropic pig endogenous retroviruses, comprising:
- 15 a) contacting a mammalian sample suspected of being infected with a pig endogenous retrovirus with a probe comprising at least a portion of SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, or SEQ ID NO:32 so as to form complexes; and
- b) detecting or determining the presence of the complexes.
- 20 18. A method of using an isolated and purified nucleic acid molecule comprising the genome of a pig endogenous retrovirus comprising: introducing to a host cell a recombinant DNA molecule comprising a promoter operably linked to a DNA segment comprising SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, or SEQ ID NO:32 so as to yield a transformed host cell, and identifying the transformed host cell.
- 25 19. The method of claim 1, 2, 3 or 18 wherein the recombinant DNA molecule further comprises transcriptional termination sequences 3' to the DNA segment.
- 30 20. A host cell, the genome of which is augmented with a recombinant DNA molecule comprising a promoter operably linked to a DNA segment encoding a fusion protein comprising at least a portion of a polypeptide of a pig endogenous retrovirus and a degradative enzyme.

21. A fusion protein, comprising: a capsid or envelope protein of a porcine  
~~endogenous virus and a degradative enzyme.~~
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22. The fusion protein of claim 21 wherein the enzyme is a nuclease.
- 5 23. The fusion protein of claim 21 wherein the enzyme is a protease.
24. The fusion protein of claim 21 wherein the enzyme is a lipase.
- 10 25. The fusion protein of claim 21 wherein the activity of said enzyme is  
calcium-dependent.
26. The fusion protein of claim 25 wherein the enzyme is staphylococcal  
nuclease.
- 15 27. An isolated and purified DNA molecule encoding the fusion protein of  
claim 21.
28. A recombinant virus comprising a nucleic acid molecule encoding the  
20 fusion protein of claim 21.
29. An antibody that specifically binds pig endogenous retrovirus.
30. The antibody of claim 29 which binds a viral capsid protein.
- 25 31. The antibody of claim 29 which binds the viral envelope glycoprotein.
32. The method of claim 8 wherein the virus is Epstein Barr virus.
- 30 33. The method of claim 8 wherein the virus is cytomegalovirus.
34. The method of claim 8 wherein the virus is human immunodeficiency  
virus.

35. The method of claim 1, 2, 3 or 18 wherein the recombinant DNA is introduced to the recipient by infection with a recombinant virus.
36. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising:
- a) introducing to donor mammalian cells a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent so as to yield transformed mammalian cells; and
  - b) introducing the transformed mammalian cells to the recipient.
37. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising:
- a) introducing to donor human cells a recombinant DNA encoding a protein comprising at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent so as to yield transformed human cells; and
  - b) introducing the transformed human cells to the recipient.
38. The method of claim 36 or 37 wherein the infectious agent is a virus.
39. The method of claim 38 wherein the polypeptide of the infectious agent is a viral capsid protein, viral glycoprotein or an accessory protein.
40. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising: introducing to a donor organ, tissue or cell a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of the receptor employed by an infectious agent to enter the cells of a mammal so as to yield a transformed organ, tissue or cell which expresses the recombinant DNA in an amount which inhibits or prevents infectious agent transmission.

41. A transgenic mammal, the genome of which is genetically altered so as to inhibit or prevent infectious agent transmission to the cells, tissues or organs of the mammal, wherein the genome is augmented with a recombinant DNA comprising a promoter operably linked to a DNA segment encoding a protein comprising at least a portion of the receptor employed by the infectious agent to enter the cells of a mammal.
42. A method to inhibit or prevent infectious agent transmission in a mammalian transplant recipient, comprising: introducing to transplant donor cells, organs or tissues a recombinant DNA comprising a promoter operably linked to a DNA segment, the expression of which confers resistance to entry, release or propagation of an infectious agent.
43. A transgenic mammal, the genome of which is genetically altered so as to inhibit or prevent infectious agent transmission to the cells, tissues or organs of the mammal, wherein the genome is augmented with a recombinant DNA comprising a promoter operably linked to a DNA segment, the expression of which confers resistance to entry, release or propagation of an infectious agent in the cells of a mammal.
44. The method of claim 42 wherein the DNA segment encodes at least a portion of a polypeptide of the infectious agent that is present in the extracellular form of the agent.
45. The method of claim 42 wherein the DNA segment encodes which encodes at least a portion of the receptor employed by the infectious agent.